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Cultural Evolution in Ishigami Village in The Anime Dr. Stone by Riichiro Inagaki: A Cultural Anthropology Study

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Abstract. This research examines how the anime Dr. Stone represents the concept of cultural evolution, focusing on the alignment of cultural development in the anime with the theories proposed by Leslie A. White and Julian Steward. Using a qualitative descriptive approach with content analysis, the study explores changes in social structure, technology, and how the Ishigami Village community adapts to its environment and challenges. The findings indicate that Dr. Stone effectively depicts cultural evolution through energy and technology, aligning with White's perspective, while reflecting societal adaptation per Steward's theory. The transformation of Ishigami Village from a foraging society to a more advanced civilization mirrors the non-linear patterns of human civilization, emphasizing the roles of technological innovation and environmental adaptation in cultural evolution. This research aims to contribute to cultural anthropology studies that utilize popular media and enhance understanding of science's role in human civilization.

Keywords: Cultural Evolution, Anime, DR. Stone, Leslie A. White, Julian Steward

1. Introduction

Cultural evolution is the process of social and technological development experienced by a society over time. This evolution involves changes in various aspects of life, such as ways of living, value systems, technology, customs, language, art, social organization, and interaction patterns among people [1,2]. Every change in a culture is inseparable from the influence of human intervention. One of the distinctive features of humans is their ability to create and enact change. These transformations undoubtedly impact the way of life of the surrounding communities, leading to what we refer to as cultural change or cultural dynamics [3].

Many anthropologists believe that culture is always evolving. There are various ways to understand the factors that play a role in the process of cultural evolution, which in turn give rise to diverse approaches for examining changes in culture. These approaches and theories are studied and applied in the fields of anthropology and social sciences to analyze how human culture develops and changes over time. Such approaches propose that culture, similar to biological organisms, can undergo transformations through a gradual process. This process includes innovations or new discoveries in technology, ideas, or social practices; diffusion, or

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the spread of cultural elements from one society to another; acculturation, which is the process of cultural exchange through interactions between different groups; and finally, selection, known as adaptive choice towards cultural elements that best meet the needs of society [4]. In anthropological studies, cultural evolution can be explained through various theories, one of which is the "Neo-Evolutionism" theory.

Cultural evolution occurs due to the increasing capacity of humans to utilize energy to sustain their lives. The more advanced the technology used by a society, the more developed its culture becomes. Meanwhile, culture develops as a form of adaptation to the environment, where each society evolves according to the geographical conditions and available resources.

This cultural development can be observed in the history of human civilization, from hunter-gatherer societies to agricultural revolutions, industrial revolutions, and the current era of information and technology. A similar concept can also be found in fictional works such as anime. Anime often addresses social, cultural, political, and historical themes relevant to everyday life. One such anime that illustrates this is Dr. Stone, which depicts how humanity rebuilds civilization from scratch after a global disaster that turns all of humanity to stone. In Dr. Stone, cultural evolution and the development of human civilization are presented through scientific elements and technological innovations brought by the main character, Senku.

One of the most prominent aspects of Dr. Stone is the role of science in shaping societal structures. The anime shows how science becomes a key factor in cultural advancement, evident in the transformation of Ishigami Village from a hunter-gatherer community to a more advanced society with technology. This advancement reflects historical patterns of human civilization, where technological innovations, such as agriculture and industry, have altered the ways humans survive and interact with one another.

Changes in social structures also become a significant highlight in this anime. Initially, leadership in Ishigami Village was based on physical strength, as illustrated by the way the village chief was chosen through physical confrontations. However, after Senku introduced various technological innovations, the leadership format began to shift towards a model that prioritized intelligence and innovation. This resembles the transition that occurred in real-world history, where societies moved from leadership based on physical strength to leadership based on knowledge and technology.

Moreover, Dr. Stone also depicts how beliefs and traditions can adapt to the progress of scientific knowledge. The inhabitants of Ishigami Village initially relied on mythological beliefs passed down through generations. However, as the knowledge brought by Senku advanced, they began to understand the world more rationally. This shift reflects the journey of humanity in the real world, transitioning from mythological thinking to scientific thinking, similar to the events that took place during the Renaissance (the age of enlightenment).

The journey of cultural evolution in Dr. Stone reflects various stages of human civilization development, from hunter-gatherer societies to achieving modern technological levels. Ishigami Village, which initially relied on nature, underwent significant transformation after being introduced to agriculture, metallurgy, electricity, and communication. This pattern of evolution aligns with the concepts proposed by White regarding the use of energy as the main factor in cultural development, as well as Steward's theory of cultural adaptation to the environment.

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2. Literature Review

Previous studies discussing cultural evolution highlight various factors that contribute to social and cultural change. Cultural evolution occurs due to various interrelated factors that drive changes in values, norms, technology, and patterns of community life. Meanwhile, the role of technology and energy as indicators of cultural advancement, while cultural evolution does not follow a single linear path but is influenced by different environmental and social factors [5]. Steward refers to this concept as multilinear evolution. Additionally, barthes' semiotic theory to analyze how the anime Dr. Stone depicts the conflict between science and physical power through the characters Senku and Tsukasa, ultimately asserting that both must complement each other for the advancement of humanity [6]. Thus, these studies provide a strong theoretical foundation for understanding cultural evolution and how these concepts are reflected in popular media, such as anime.

This research aims to analyze how the anime Dr. Stone represents the concept of cultural evolution, focusing on the extent to which cultural development in this anime aligns with the cultural evolution theories. Additionally, this research aims to provide new insights into how popular media, such as anime, depict the processes of human civilization development in a scientific and realistic manner, as well as compare the cultural evolution in Dr. Stone with the history of human civilization in the real world. Moreover, this paper is expected to serve as a reference for cultural anthropology studies that utilize fictional media as research objects, and to provide an understanding of how science plays a crucial role in shaping civilization.

3. Method

In this research, the method used is descriptive qualitative method with a content analysis approach. The descriptive method is employed to provide a systematic, accurate, and factual representation of the cultural evolution depicted in the anime Dr. Stone, focusing on how the culture in Ishigami Village develops over time. Descriptive research aims to describe the status of an object, condition, or system of thought being investigated systematically and accurately, as well as to reveal the relationships among existing phenomena. This study will analyze the influence of science and technology on social change and connect it with the cultural evolution theory put forth.

In the process, the researcher will utilize content analysis to assess specific elements within the anime, such as narrative, characters, and events that illustrate stages of cultural evolution. Content analysis is a technique used to draw valid and reliable inferences about specific characteristics of visuals or texts or communication being analyzed by identifying certain patterns or themes. Researchers will identify important themes such as social changes, adaptation to the environment, as well as the role of technology and science in the cultural development of Ishigami Village society. Each episode will be analyzed to see how these changes occur gradually.

The data collection process is done through in-depth observation of the texts and visuals in the anime Dr. Stone. The researcher will note important elements relevant to cultural evolution and complement the analysis with additional literature regarding cultural evolution theory and cultural analysis in media. The analysis results will link the stages of cultural evolution in the anime with human cultural development in the real world, using theoretical approaches.

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4. Results and Discussion

This chapter discusses how the concept of cultural evolution is reflected in the *anime Dr. Stone*, which is the subject of this research. Utilizing the cultural evolution theories, this study will analyze how culture develops and changes within the context being examined. Cultural evolution can be observed through changes in social structures, technology, and the adaptation of society to the environment and the challenges they face.

In the analyzed *anime*, cultural shifts are demonstrated through the interactions between individuals and their environment, technological innovations, as well as conflicts between tradition and modernity. By understanding these changes, we can see how a civilization evolves and how cultural elements endure or transform over the course of time.

4.1. Cultural Evolution in the Perspective of White (1959)

Culture evolves alongside the increasing utilization of energy and technological advancements. According to him, the progress of a society can be measured by the amount of energy they use and how efficiently they utilize it to support their lives.

In *Dr. Stone*, this theory is clearly reflected in how Senku introduces various innovations that gradually elevate the level of civilization in Ishigami Village. Before Senku's arrival, the society was still in the hunter-gatherer stage and lived with very simple technology. However, with the aid of science, they began to experience a surge in civilization in a short period.

The Table 1 shows how the stages of cultural evolution according to White's theory are reflected in *Dr. Stone*.

Table 1. Theory of Cultural Evolution by White (1959) as reflected in *Dr. Stone*

Phase	Evolution in Human History	Evolution in *Dr. Stone*
Primitive Society (Hunting-Gathering)	Primitive humans lived a nomadic lifestyle, relying on nature for food and shelter.	The inhabitants of Ishigami Village live without advanced technology, hunting and gathering food to survive.
Agricultural Revolution	The society began to practice agriculture, settle down, and develop farming systems.	Senku introduced agriculture as a more stable way to meet the food needs of the community.
Early Industrial Revolution	The emergence of mass production, the utilization of metals, and simple manufacturing such as textile factories and printing.	Senku developed basic machines such as water wheels to increase production, as well as introduced metal printing for tools.
Scientific and Technological Revolution	The invention of electricity, long-distance communication, and modern transport brought significant changes to human life.	Senku created electricity with a generator and light bulbs, developed a radio for long-distance communication, and even designed a steam engine.

4.2. Primitive Society (Hunting-Gathering)

4.2.1. Evolution in Human History

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Primitive humans lived as hunters and gatherers before the advent of agriculture. They relied on natural resources and hunted animals to fulfill their food needs. Their nomadic lifestyle involved moving around as they followed the migration of prey and sought out more abundant food sources. There was no concept of land ownership or complex social systems, as they simply hunted and shared their catches.

4.2.2. Evolution in *Dr. Stone*

The inhabitants of Ishigami Village originally lived as hunters and gatherers. They relied on hunting wild animals and gathering fruits and wild plants to survive. They did not have an agricultural system or advanced technology to produce food in large quantities. The society was still heavily influenced by mythology and traditional beliefs. They believed that Senku was a descendant of Byakuya, and they had no scientific understanding of the world (see Figure 1.

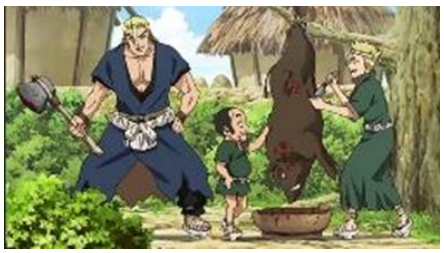

Figure 1. Hunting Spoils. Source: *Dr. Stone*, Episode 7 (2019)

4.3. Agricultural Revolution

4.3.1. Evolution in Human History

Around 10,000 years ago, humans began to practice agriculture, which allowed them to settle down and build villages or towns. With farming, they were able to produce food in large quantities and store their harvests for the future. This revolution became the foundation for the further development of civilization.

4.3.2. Evolution in *Dr. Stone*

When Senku arrived in Ishigami Village, he introduced an agriculture system. By planting crops such as wheat and potatoes, the community was no longer completely reliant on hunting and gathering for food. This provided them with a more stable food source, improved their well-being, and allowed them to focus more on other innovations (see **Figure 2**).

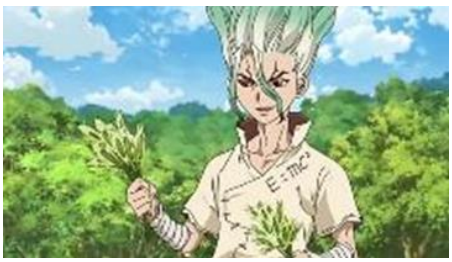

Figure 2. Squirrel's Tail Wheat Field. Source: *Dr. Stone*, Episode 8 (2019)

4.4. Early Industrial Revolution

4.4.1. Evolution in Human History

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The Industrial Revolution in the 18th century introduced simple machines that increased production efficiency. For example, water power was used to drive textile mills, and humans began using metal to create more durable and effective tools.

4.4.2. Evolution in *Dr. Stone*

Senku began developing basic industrial technologies such as waterwheels to ease work and increase production. He also introduced metal printing, which allowed the community to create better tools and produce various objects more quickly (see Figures 3 and 4).

Figure 3. Metal Printing Tool. Source: *Dr. Stone*, Episode 15 (2019)

Figure 4. Water Mill. Source: *Dr. Stone*, Episode 20 (2019)

4.5. Scientific and Technological Revolution

4.5.1. Evolution in Human History

The invention of electricity, long-distance communication, and modern transportation dramatically changed human life. Technologies such as radio, steam engines, and electrical power systems enabled people to communicate and work more efficiently.

4.5.2. Evolution in *Dr. Stone*

Senku brought major innovations such as electricity, light bulbs, and long-distance communication radios. In addition, he also developed steam engines, which are one of the essential foundations of the industrial revolution. With this technology, society progressed further toward modern civilization (see Figures 5, 6, dan 7).

Figure 5. Japanese Bamboo Lamp. Source: *Dr. Stone*, Episode 22 (2019)

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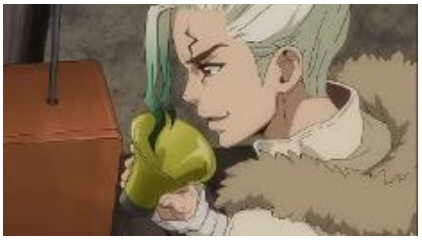

Figure 6. Long-Distance Communication Device. Source: *Dr. Stone: Stone Wars*, Season 2, Episode 3 (2021)

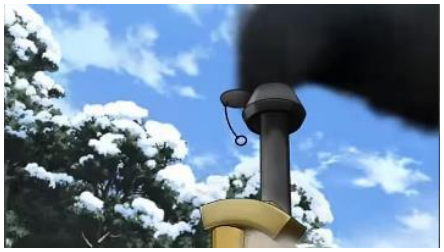

Figure 7. Steam Engine. Source: *Dr. Stone: Stone Wars*, Season 2, Episode 5 (2021)

In conclusion, *Dr. Stone* reflects the stages of cultural evolution in the real world. The transition from hunting-gathering to agriculture, then to industry and advanced technology, follows a pattern similar to the development of human history. According to White's theory, the more energy utilized (from human power to water power, then electricity), the more advanced the resulting civilization. In *Dr. Stone*, the role of science and technology becomes a key factor that accelerates the cultural evolution of Ishigami Village, just as it does in the real world.

4.6. Cultural Adaptation in the Perspective of Steward (1955)

The multilinear cultural evolution theory, which states that cultures evolve differently depending on the environment and the needs of society. Not all civilizations follow the same developmental path; instead, they adapt to the challenges present in their surroundings. In *Dr. Stone*, cultural adaptation occurs as a response to natural conditions and resource limitations. Below is a table that illustrates the cultural adaptations that take place in Ishigami Village and Senku's group based on Steward's theory (see Table 2).

Table 2. Cultural Evolution Adaptation. Theory by Steward (1955) as reflected in *Dr. Stone*.

Categories of Adaptation	Adaptation in Human History	Adaptation in *Dr. Stone*
Utilization of Natural Resources	Communities utilize local resources for survival, such as using stone and wood for tools.	Senku uses natural materials such as sulfuric acid, metals, and sulfur to create new technology.
Developing Social Structure	Early societies had a simple leadership system that evolved with the advancement of civilization.	Initially, Ishigami Village was led based on lineage and physical strength, and later evolved into a leadership based on knowledge.

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Categories of Adaptation	Adaptation in Human History	Adaptation in *Dr. Stone*
Conflict between Tradition and Modernity	The Industrial Revolution faced resistance from groups who feared losing their jobs and old traditions.	Tsukasa rejects technological progress because he believes that the resurgence of the old civilization will lead to social injustices.
Adaptation in Extreme Conditions	Society must adapt after natural disasters, such as changes in farming patterns after the "Year Without a Summer" (1816).	After petrification, humanity must find new ways to survive, while Senku accelerates the process with science.

4.6.1. Utilization of Natural Resources

4.6.1.1. Adaptation In Human History

Societies have always adapted to their environment by utilizing the available natural resources. For example, tribes living in cold regions use animal fur as clothing, while communities in tropical areas rely more on natural materials such as leaves and wood for shelter.

4.6.1.2. Adaptation In *Dr. Stone*

Senku and his team must utilize the resources available in nature to rebuild civilization. They discover and harness sulfuric acid from a toxic lake for chemical purposes, sulfur for medicine, and metals from nearby rocks. To generate electricity, they use hydropower (water wheels), which is an adaptation to the geographical conditions they face (see Figures 8 and 9).

Figure 8. Taking sulfuric acid. Source: *Dr. Stone*, episode 12 (2019)

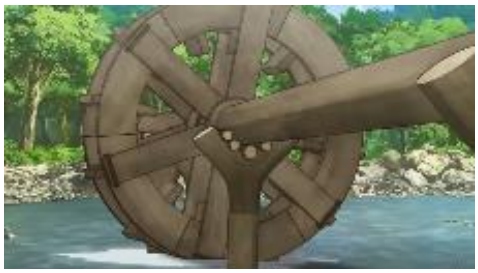

Figure 9. Making a waterwheel. Source: *Dr. Stone*, episode 20 (2019)

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4.6.2. Developing Social Structure

4.6.2.1. Adaptation In Human History

The social structure changes based on the needs of society. For example, hunter-gatherer societies typically have a simpler hierarchy compared to agrarian societies, which require a more complex leadership system to manage the distribution of resources.

4.6.2.2. Adaptation In *Dr. Stone*

Before Senku's arrival, Ishigami Village had a leadership system based on lineage and physical strength. After Senku introduced technology and science, the society began to adapt to a leadership system based on expertise and innovation. The village leader, originally Kokuyo (who was lineage-based), eventually made way for Senku, who was respected for his ability to bring about significant change (see Figure 10).

4.6.3. Conflict between Tradition and Modernity

4.6.3.1. Adaptation In Human History

Cultural changes often face resistance from groups that wish to maintain the status quo. For example, during the Industrial Revolution, many manual laborers rejected machines out of fear of losing their jobs.

4.6.3.2. Adaptation In *Dr. Stone*

Tsukasa opposes technological advancement because he believes that the resurgence of an old civilization will bring back social injustices. He attempts to destroy the statues of those he deems unworthy of being revived. This conflict reflects how, throughout human history, technological progress often triggers resistance from those who feel that changes threaten traditional values or the existing social order (see Figure 11).

Figure 10. Senku leads the kingdom of science. Source*: Dr. Stone: Stone Wars*, Season 2, Episode 11 (2021)

Figure 11. Tsukasa destroys the statue. Source: *Dr. Stone*, episode 4 (2019)

4.6.4. Adaptation in Extreme Conditions

4.6.4.1. Adaptation In Human History

When natural disasters or drastic environmental changes occur, societies must adapt in new ways to survive. For instance, after the eruption of Mount Tambora in 1815, which caused the "Year without a Summer," many communities had to change their agricultural practices.

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4.6.4.2. Adaptation In *Dr. Stone*

After humanity experienced petrification for thousands of years, only a few managed to survive. The residents of Ishigami Village had to find new ways to endure without the help of modern technology. When Senku arrived, they had to adjust to sudden advancements, such as learning to use new tools and understanding scientific concepts (see Figure 12).

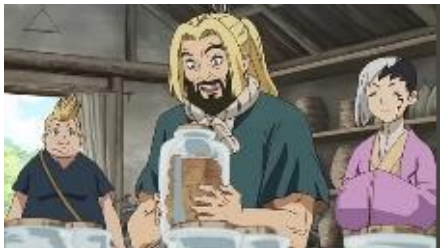

Figure 12. Canned food for winter. Source: *Dr. Stone*, episode 21 (2019)

Steward's theory helps explain how cultural adaptation occurs in *Dr. Stone*. This adaptation is evident in the way societies adjust to their environment, develop new social structures, confront conflicts between tradition and modernity, and persevere in extreme conditions.

Similar to human history, cultural change in *Dr. Stone* does not happen in a linear fashion but is influenced by the environment and the challenges faced. This illustrates that cultural evolution is not only about technological advancement but also about how communities adapt to the changes around them.

Based on the cultural evolution theories of White (1959) and Steward (1955), the development of civilization in *Dr. Stone* reflects how technological innovation and environmental adaptation drive cultural evolution. From White's perspective, the community of Ishigami Village evolves along with the increased utilization of energy and technology, progressing from a hunting-gathering lifestyle to a mini-industrial era characterized by electricity and communication. Meanwhile, Steward's viewpoint suggests that cultural change in *Dr. Stone* is adaptive and depends on environmental conditions and societal needs, such as the utilization of natural resources, transformations in social structure, and conflicts between tradition and modernity. Thus, the *anime* not only represents how humanity can rebuild civilization from scratch but also emphasizes that cultural evolution is a dynamic process influenced by technology and the environment.

5. Conclusion

Dr. Stone, an anime, effectively represents the concept of cultural evolution through the theories. The transformation of Ishigami Village from a primitive society to a technologically advanced one demonstrates the importance of energy and technology in driving civilization. The community's unique adaptations to their environment and challenges reinforce Steward's theory of multilinear cultural evolution. Dr. Stone serves as a profound reflection on values and concepts evolving alongside technological advancements, prompting viewers to contemplate the impact of such changes on human life and society. It also serves as a captivating mirror of the human journey, emphasizing the importance of collaboration, innovation, and adaptation in facing unforeseen challenges and shaping a better future. Further research on cultural evolution in literary works is essential, as scientific examination is relatively rare.

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